SAT802S
User Manual

V1.3
2014-11-24

China Aerospace Telecommunications Limited

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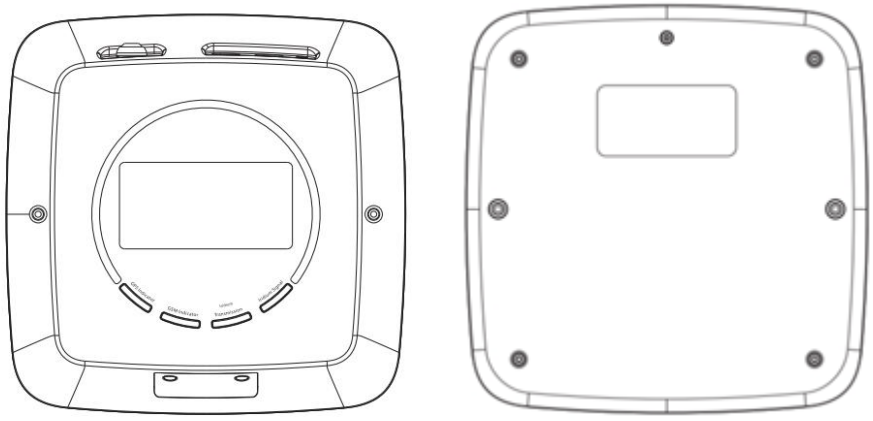
1 Definition

SAT-802S is dual mode Iridium&GSM tracker that combines with Iridium SBD and GPRS to send gps data globally.

It is suitable for global vessel tracking solutions at lower cost by its intelligent working mode.

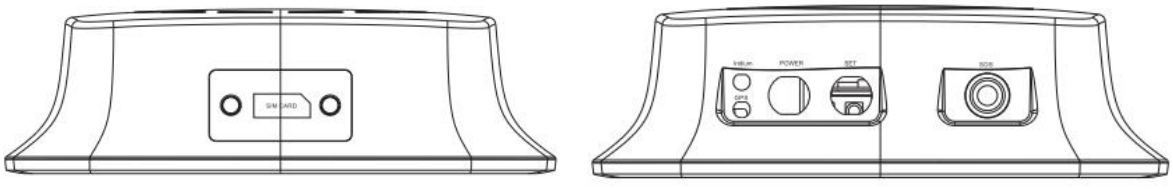
Best choice for Air,Sea,Mountain,Desert,etc,anwhere on earth.Full coverage in Globa,,No
Blind Area.

This device is using dual mode iridium &GSM communication to offer GPS tracking which is consist of main box ,power supply, GPS antenna, iridium antenna and other specific accessories. Following is main box external view:

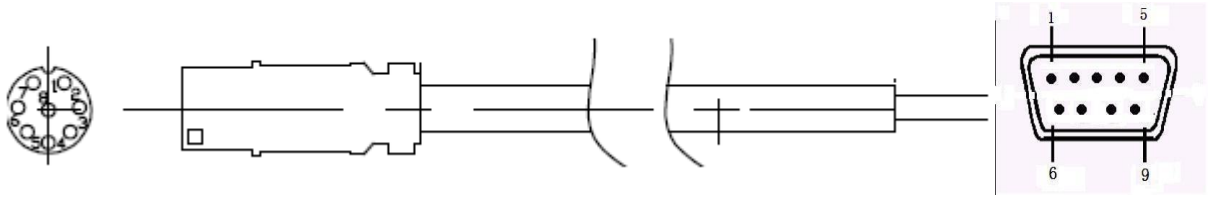


1.1 Hardware interface

SAT802S host provides five external interfaces, that's Power supply & Data transmission interface, Handset port interface, Iridium antenna interface, GSM antenna interface and GPS antenna interface as shown below.



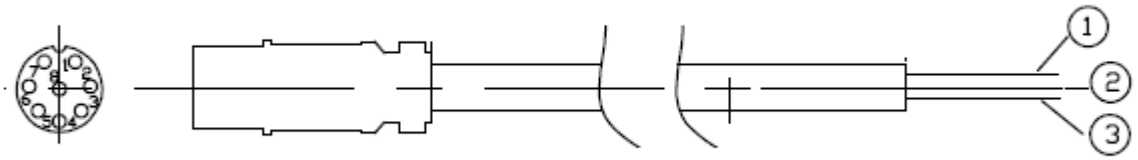
1.2 Handset port definition(Local setting and upgrading)



Pin number	Indication	Function	Color
1	RXD	Used for communicate between device and port tool.	
2	TXD		
3	5V DC		
4	Ground		
5	SPK	Speeking interface	
6	SPK		
7	MIC+	microphone interface	
8	MIC-		

Used for parameters setting and firmware upgrading.

1.3 Power and data transmission cable.



Pin number	Indication	Function	Color
1	Power DC9-36V	power input	Red(thick)
5	GND	Ground	Black(thick)
9	ACC	ACC input(+)	White

2	Power out put DC 5V	5V DC	2*2 232 Interface
3	RXD	RXD 232	2*2 232 Interface
4	TXD	232 TXD	2*2 232 Interface
5	GND	Ground	2*2 232 Interface
6	VIN	VIN	Dark green
7	GND1	Ground	Blue
8	GND2	GND SOS	SOS interface
10	SOS	I/O SOS	SOS interface
11	Beep	I/O Beeper	Pink
12	OU1	I/O power control	Purple

2 Functions

SAT-802S is dual mode Iridium&GSM tracker that combines with Iridium SBD and GPRS to send gps data globally.
It is suitable for global vessel tracking solutions at lower cost by its intelligent working mode.
Best choice for Air,Sea,Mountain,Desert,etc,anywhere on earth.Full coverage in Globa,,No Blind Area.

Features
Dual mode communication: Iridium SBDand GPRS.
Auto choose communication channel,GPRS is top priority.
Global GPS location tracking
Global text message transmission
Relative lower monthly cost
SOS
Geo-fence
Dual RS232 extend: temperature sensor,3 channel camera,LCD screen
5 I/O
OTA wireless upgrading
Air,Sea,Mountain,Desert,etc,anwhere on earth.Full coverage in Globa,,No Blind Area.
Leverage on GSM and Iridium satellite networks,able to switch automatically,depending on GSM

2.1 Device initialization

After host powers up, four indicators will fully light for 1 second, then fully turn off. Later, terminal starts to initialization process.
If GPS module works well, after GPS has valid positioning, "GPS indicator" will start blinking.
Meanwhile, GSM initialization begins. If initialization is successful, "GSM indicator" lights, then dial to centre server. After a successful connection, "GSM indicator" starts blinking.
When GSM initialization finished, system will run Iridium module's initialization. If successful, "Iridium network" indicator starts blinking.

2.2 Parameter settings

Device should set parameters before use. There is two ways for parameters setting. You can set parameters through setting tool via device's Handset port, or set by monitoring center after intergrading the protocol to your server.

2.3 Working mechanism of data transparent transmission

Any data not being above-mentioned parameter format that terminal serial port received will be considered as "user transparent transmission data", and according to channel status, data will be sent to its destination by GPRS data link or Iridium SBD.

Bytes interval in the data packet of "user transparent transmission data" should not be larger than 0.5 second and the length of each data packet should not be larger than 336 bytes. When large amounts of data need to be transmitted, data will be divided into packets.

Data transmission between terminals has a data length limit with a maximum of 266 bytes.

As a response, after sending "user transparent transmission data", device then sends a "SEND OK" message to external data device via serial port. After external data device receives this response, it prepares to send next data packet.

In dual-mode communication, GPRS channel has priority. If condition meets < login failed or heartbeat confirmation failed, reboot GPRS link connection, if failed, wait 30 seconds, then again, if still failed after three times>, it will automatically switch to Iridium SBD communication channel. In Iridium SBD communication channel mode, system still keep booting GPRS link connection until connecting successfully, if connected, communication mode turns to GPRS communication channel.

2.4 LED indicator for working status

2.4.1 GSM status

Blinking: GPRS network login success.

Always light: Do not login to GPRS network yet.

Turn off: sleep status, GSM does not work or GSM fault.

2.4.2 GPS status

Blinking: GPS positioned successfully.

Always light: searching signal.

Turn off: sleep status, GPS does not work or GPS fault.

2.4.3 Iridium network

Blinking: Iridium is in network service status.

Always light: Iridium is not in network service status.

Turn off: sleep status, Iridium does not work or Iridium fault.

2.4.4 Iridium sending status

Blinking: Iridium is receiving or sending data.

3 Setting Guide

Terminal parameters can be set through CASTELECOM PC Tool, platform and SMS.

3.1 CASTELECOM PC Tool Setting

Professional setting tool “CASTELECOM PC Tool” can be installed in your computer. For detailed using method, please refer to user manual.

CASTELECOM PC Tool User Manual

For detailed description of PC Tool and PC Tool software, please download from http://www.castelecom.com .

3.2 Platform Parameter Setting

After Terminal insert SIM card and power on, it will login into platform, then can set almost all parameters remotely through platform. Such as the upload time interval, Area alarm, Temperature alarm area, Preset Number etc.

3.3 SMS Setting

The first any phone number that be used to set or read parameters through SMS will become the super authorized phone number. The other two authorized phone numbers can be set by the super authorized phone number. For detailed using method, please refer to user manual.

Remotely SMS maintain guide.do

4 Installation Guide

The terminal integrate the GSM antenna in it .We need put in the SIM cart ,put on the GPS antenna ,IRIDIUM antenna, and the power cable.

Specific as follows :

4.1 Installation of SIM card

Insert the SIM card before installation of the main unit. Operation steps of which are as follows:

1) Open the side plate of the main unit with screw driver.

2) Insert the SIM cards by directing it at the card seat.

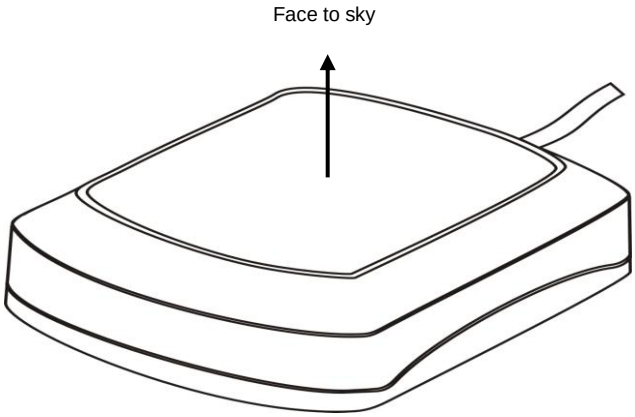
3) Fix the side plate to the main unit, fasten the screw and secure it.

4.2 Placement of SAT802S main unit

The location for placement of the SAT802S main unit should be determined in advance. The location should allow anti-humidity, avoidance of high-temperature area, and be far away from magnetic field and other sensitive electronic equipment.

4.3 Installation of GPS antenna

GPS antenna must not be installed under metal baffle plate because it can hinder receipt of GPS signals, thus affecting the normal monitoring and positioning of the SAT802S main unit. Try to install GPS antenna as horizontally as possible. Place the convex upward, and its included angle with the ground must not exceed 15 degrees. Besides, it must be fixed securely.



4.4 Installation of Iridium antenna

Iridium antenna must not be installed under metal baffle plate because it can hinder transmission and receipt of satellite signals. Try to install Iridium antenna as horizontally as possible. Place the antenna upward without high buildings nearby and its included angle with

the ground must not exceed 15 degrees. Besides, it must be fixed securely and far from GSM antenna. It is recommended that the distance between Iridium antenna and GSM antenna should be no less than 1.5m.

Warning!: Any change of the GPS, GSM and Iridium antennas' feedback cable may affect the normal working of the SAT802S.

4.5 Installation of power & data transmission cable

Power cable is consist of 3 core wire, including power input, ACC input, Ground.

The power input :DC 9-36V

Pin number	Indication	Function	Color
1	Main power input	power input	Red
2	Ground	Ground	Black(thick)
3	ACC input	ACC input(+)	White

REMARKS: link the cables correctly with the vehicle and then link to the device, fix firmly to avoid any damage in shock.

4.5.1 Link external power

Main power input cable(red) is linked to positive pole of main power of automotive wiring, and make sure it is permanently supply power(when main power of vehicle is off, the port is still supplying power); GND(black(thick)) link to negative pole of main power or rely on bonding.

Please make sure whether the vehicle power voltage is suitable for the device power voltage range.

Please make sure positive pole of your power connected with the red wire; otherwise the device will be damaged!

4.5.2 Link ACC cable

Link ACC cable (Orange) to ON of vessel key. Link I/O power input (pink) to the positive pole of main power of automotive wiring, I/O Ground is linked to negative pole of main power of automotive wiring or rely on bonding.

5 Specific characters of SAT-802S

5.1 Electrical specification

5.1.1 Electric parameters of main unit

Working voltage: 9V – 36V DC

Data transmission: Iridium SBD and GPRS dual-mode communication

Positioning: GPS

Max working current: <450mA@13.8V (Transient peak current 2W)

Working current in data transceiving: <350 mA@13.8V

Standby working current: <145mA@13.8V

Working current when power saving: <95mA@13.8V

Working temperature: -30℃ ~ +70℃

Storage temperature: -40℃ ~ +85℃

RH(relative humility): 5%～95% (no frosting)

Protection degree: IP66

5.1.2 Iridium parameters

Iridium module: Iridium 9602

Frequency: 1616 ～ 1626.5 MHz

Output power: 1.36W

Receiving sensitivity: -118.5dBm at 50W (typically)

Global coverage, no blind areas.

Duplex mode: TDD (Time Division Duplex)

Upstream data: maximum length is 340 bytes

Downstream: maximum length is 270 bytes

Transmission delay: 10 – 60 seconds (because of galaxy switch)

Input/Output impedance: 50Ω

Multiplex mode: TDMA/FDMA

Iridium antenna and interface: external antenna, SMA interface

Antenna gain: 2dBi

5.1.3 GSM parameters

GSM modules: SIMCOM SIM900

GSM/GPRS receiving frequency: 850/900/1800/1900MHZ quad-band

Network communication protocol: embedded TCP/IP protocol stack, support TCP/IP
Receiving sensitivity: <-106dBm
Max sending power: GT850MHz Class4(2W)，GSM1900MHz Class1(1W)
GPRS multi-channel level: GPRS CLASS 10
Compatible communication protocol: GSM/GPRS Phase2/2+
GPRS mobile location level: Class B
GSM antenna and interface: external antenna, SMA interface
Antenna gain: 2dBi

5.1.4 GPS parameters

Receiver: 50 channel u-blox 5 engine GPS L1 C/A code

Support: WAAS, EGNOS, MSAS, GAGAN

Max update rate: 4 Hz

Accuracy:

Positioning: 2.5 m CEP

SBAS: 2.0 m CEP

Capture:

Cold start: 32 s

Hot start: 32 s

Auxiliary start: < 1 s

Sensitivity:

Tracking: -160 dBm

Re-capture: -160 dBm

Cold start: -143 dBm

A-GPS: support AssistNow Online and AssistNow Offline, under OMA SUPL specification

Operating restrictions:

Speed: 500 m/s (972 knots)

Height: 50,000 m

Antenna: external active antenna, SMA interface

Antenna gain: 28dBi

5.2 Mechanical specification

Sheathing material: Aluminum alloy

Main unit size: 230mm (W)*68mm (H)*230mm (L)

Main unit weight: Approx. 400g

6 FAQ

Fault indicator	possible reason	ways
Four lights off	No power input	Check whether the external power is linked correctly.
	device problem	Contact supplier
GPS indicator permanently off	GPS antenna placed in unsuited place	Check whether the antenna is faced to sky
	GPS antenna damage	Change GPS antenna
	Connect problem with GPS antenna	Check GPS antenna port and fix firmly
	device problem	Contact supplier
GSM indicator permanently off	uninstall the SIM	Install the SIM
	no charge	Charge the SIM
	device problem	Contact supplier
Iridium indicator permanently off	Problem in link between Iridium and main board	Contact supplier.
Iridium indicator permanently on	Iridium antenna placed in unsuited place	Check whether the antenna is faced to sky
	Iridium module service stop	contact with Iridium service operator
Iridium transmission indicator permanently on	Iridium antenna placed in unsuited place	Check whether the antenna is faced to sky
Receive frequent alarms	SOS button did not reset	Error in button, change button
Monitor center did not get data from device	Long time interval of GPS sending	Set appropriate time interval
	Set commands to stop sending data	Reset and allow gps data sending
	SIM installation wrong	Re-install SIM
	SIM card problem	Check whether SIM can support GPRS.
	APN setting wrong	Consult local cellular service provider
	IP address setting wrong	Reset parameters: IP, Port.